

REMARKS

Applicants have received two substantially identical non-final Office Actions dated October 17 and October 24, 2006. Examiner McCarthy, in the telephone conversation on January 16, 2007 confirmed to the applicants that the three-month due date for the response to this non-final Office Action is January 24, 2007.

Reconsideration of this application as amended is respectfully requested. Applicants acknowledge with appreciation the Examiner's allowance of claims 25-29.

Claims 1-3, 6-11, 13-17, 19-22, and 25-33 are pending. Claims 1-3, 6-11, 13-17, 19-22, and 30-33 have been rejected.

Claims 1, 8, 15, 21, and 30 have been amended. No claims have been canceled. No claims have been added. Support for the amendments is found in the specification, the drawings, and in the claims as originally filed. Applicants submit that the amendments do not add new matter.

REJECTIONS UNDER 35 U.S.C. § 102

The Examiner has rejected claims 1, 7, 8, 15, 20, 21, 30-33 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,912,707 to Kogge, et al. ("Kogge").

Applicants have amended claim 1 to include at least one replay queue coupled to the check unit and to the protected execution unit, where the one or more replay queues issue a plurality of instructions to the protected execution unit for processing, track the plurality of instructions issued to the protected execution unit, and selectively reissue one or more of the plurality of instructions to the protected execution unit for which the check unit detects an error.

Kogge rather discloses a checkpoint retry mechanism. More specifically, Kogge

discloses:

An error checker is included in the checkpoint retry mechanism, which has an input connected to an output of the arithmetic logic unit, for detecting errors occurring in the arithmetic logic unit. The contents of the checkpoint address register are transferred to the instruction memory address register in response to the error checker detecting an error in the operation of the arithmetic logic unit. This results in the contents of the instruction memory address register becoming the checkpoint address which is used for retrying the sequence of instructions following the current checkpoint address value in response to the detection of an error.

(Kogge, col. 2, lines 47-58) (emphasis added)

In particular, Kogge discloses:

A third AND gate 76 in FIG. 1 has a first input connected to the output of the checkpoint address register 46 and a second input connected to an output of the error checker 74, for transferring the contents of the checkpoint address register 46 to the instruction memory address register 38, in response to the error checker 74 detecting that an error has occurred in the operation of the arithmetic logic unit 22. The resulting contents of the instruction memory address register 38 will now be the current value of the checkpoint address for retrying the sequence of instructions following the current checkpoint address value.

(col. 5, lines 57-68) (emphasis added)

Thus, Kogge merely discloses retrying the sequence of instructions that follow the checkpoint address in response to the error detection. In contrast, amended claim 1 refers to selectively reissue one or more of the plurality of instructions to the protected execution unit for which the check unit detects an error.

Because Kogge fails to disclose all limitations of amended claim 1, applicants respectfully submit that amended claim 1 is not anticipated under 35 U.S.C. §102(b) by Kogge.

Given that claims 7, 8, 15, 20, 21, 30-33 contain related limitations, applicants respectfully submit that amended claims 7, 8, 15, 20, 21, 30-33 are not anticipated under 35 U.S.C. §102(b) by Kogge.

REJECTIONS UNDER 35 U.S.C. § 103

The Examiner has rejected claim 2 under 35 U.S.C. §103(a) as being unpatentable over Kogge in view of U.S. Patent No. 5,604,753 to Bauer et al. ("Bauer").

As set forth above, Kogge fails to disclose at least one replay queue coupled to the check unit and to the protected execution unit, where the one or more replay queues issue a plurality of instructions to the protected execution unit for processing, track the plurality of instructions issued to the protected execution unit, and selectively reissue one or more of the plurality of instructions to the protected execution unit for which the check unit detects an error.

Bauer, in contrast, discloses performing an error correction from an external memory (Abstract) and similarly to Kogge fails to disclose at least one replay queue coupled to the check unit and to the protected execution unit, where the one or more replay queues issue a plurality of instructions to the protected execution unit for processing, track the plurality of instructions issued to the protected execution unit, and selectively reissue one or more of the plurality of instructions to the protected execution unit for which the check unit detects an error, as recited in amended claim 1.

Thus, neither Kogge, Bauer, nor a combination thereof discloses such limitations of amended claim 1.

Given that claim 2 depends from amended claim 1, applicants respectfully submit that claim 2 is not obvious under 35 U.S.C. §103(a) over Kogge in view of Bauer.

The Examiner has rejected claims 3, 9-11, 13, 14, 16 and 22 under 35 U.S.C. §103(a) as being unpatentable over Kogge in view of U.S. Patent No. U.S. Patent No. 5,659,721 to

Shen ("Shen").

As set forth above, Kogge fails to disclose at least one replay queue coupled to the check unit and to the protected execution unit, where the one or more replay queues issue a plurality of instructions to the protected execution unit for processing, track the plurality of instructions issued to the protected execution unit, and selectively reissue one or more of the plurality of instructions to the protected execution unit for which the check unit detects an error, as recited in amended claim 1.

Shen, in contrast, discloses checkpointing instructions to maintain precise state (Abstract) and similarly to Kogge fails to disclose at least one replay queue coupled to the check unit and to the protected execution unit, where the one or more replay queues issue a plurality of instructions to the protected execution unit for processing, track the plurality of instructions issued to the protected execution unit, and selectively reissue one or more of the plurality of instructions to the protected execution unit for which the check unit detects an error, as recited in amended claim 1.

Thus, neither Kogge, Shen, nor a combination thereof discloses such limitations of amended claim 1.

Given that claims 3, 9-11, 13, 14, 16 and 22 contain related limitations, applicants respectfully submit that claims 3, 9-11, 13, 14, 16 and 22 are not obvious under 35 U.S.C. §103(a) over Kogge in view of Shen.

The Examiner has rejected claim 6 under 35 U.S.C. §103(a) as being unpatentable over Kogge in view of U.S. Patent No. 5,247,628 to Grohoski ("Grohoski").

As set forth above, Kogge fails to disclose at least one replay queue coupled to the check unit and to the protected execution unit, where the one or more replay queues issue a

plurality of instructions to the protected execution unit for processing, track the plurality of instructions issued to the protected execution unit, and selectively reissue one or more of the plurality of instructions to the protected execution unit for which the check unit detects an error, as recited in amended claim 1.

Grohoski, in contrast, discloses parallel processor instruction dispatch apparatus with interrupt handler (Abstract) and similarly to Kogge, fails to disclose at least one replay queue coupled to the check unit and to the protected execution unit, where the one or more replay queues issue a plurality of instructions to the protected execution unit for processing, track the plurality of instructions issued to the protected execution unit, and selectively reissue one or more of the plurality of instructions to the protected execution unit for which the check unit detects an error, as recited in amended claim 1.

Thus, neither Kogge, Grohoski, nor a combination thereof discloses such limitations of amended claim 1.

Given that claim 6 contains similar limitations, applicants respectfully submit that claim 6 is not obvious under 35 U.S.C. §103(a) over Kogge in view of Grohoski as well.

The Examiner has rejected claim 17 under 35 U.S.C. §103(a) as being unpatentable over Kogge in view of Shen as applied to claim 16, and in further view of Bauer.

Kogge merely discloses retrying the sequence of instructions that follow the checkpoint address in response to the error detection, and fails to disclose the replay unit to repetitively replay selected instructions of the plurality of instructions for which the check unit indicates an error, as recited in amended claim 15.

Shen, in contrast, discloses checkpointing instructions to maintain precise state (Abstract) and similarly to Kogge fails to disclose the replay unit to repetitively replay

selected instructions of the plurality of instructions for which the check unit indicates an error, as recited in amended claim 15.

Bauer, in contrast, discloses performing an error correction from an external memory (Abstract) and, similarly to Kogge and Shen, fails to disclose the replay unit to repetitively replay selected instructions of the plurality of instructions for which the check unit indicates an error, as recited in amended claim 15.

Thus, neither Kogge, Shen, Bauer, nor any combination thereof discloses such limitations of amended claim 15.

Given that claim 17 contains related limitations, applicants respectfully submit that claim 17 is not obvious under 35 U.S.C. §103(a) over Kogge in view of Shen, and further in view of Bauer.

The Examiner has rejected claim 19 under 35 U.S.C. §103(a) as being unpatentable over Kogge in view of Shen as applied to claim 16, and in further view of Hennessy "Computer Organization and Design", copyright 1998 ("Hennessy").

Kogge merely discloses retrying the sequence of instructions that follow the checkpoint address in response to the error detection, and fails to disclose the replay unit to repetitively replay selected instructions of the plurality of instructions for which the check unit indicates an error, as recited in amended claim 15.

Shen, in contrast, discloses checkpointing instructions to maintain precise state (Abstract) and similarly to Kogge fails to disclose the replay unit to repetitively replay selected instructions of the plurality of instructions for which the check unit indicates an error, as recited in amended claim 15.

Hennessy, in contrast, discloses a computer organization and design glossary, and

similarly to Kogge and Shen, fails to disclose the replay unit to repetitively replay selected instructions of the plurality of instructions for which the check unit indicates an error, as recited in amended claim 15.

Thus, neither Kogge, Shen, Hennessy, nor any combination thereof discloses such limitations of amended claim 15.

Given that claim 19 depends from amended claim 15 and add additional limitations, applicants respectfully submit that claim 19 is not obvious under 35 U.S.C. §103(a) over Kogge in view of Shen, and further in view of Hennessy.

CONCLUSION

In view of the foregoing, Applicant respectfully submits the present application is now in condition for allowance. Please charge Deposit Account No. 02-2666 for any shortage of fees in connection with this response.

Respectfully submitted,

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Date:

January 17, 07



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